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ABSTRACT

This comprehensive review of literature pertinent to the use of music in instructional films presents selected opinions, viewpoints, and hypotheses as an approach preliminary to experimentation. The need for research work in seeking principles which govern the operation of music to reinforce learning and the need to state such relationships as may be found quantitatively is particularly great because film producers need to have authentic guidelines for including particular amounts and kinds of music in instructional films. The functions and techniques of music in motion pictures and the functions of the film music composer are discussed. A selected bibliography on motion picture music is appended. (GO/MF)

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TECHNICAL REPORT -SDC 269-7-2

MUSIC IN MOTION PICTURES: REVIEW OF LITERATURE WITH IMPLICATIONS FOR INSTRUCTIONAL FILMS

(Rapid Mass Learning)

Pennsylvania State College
Instructional Film Research Program
15 May 1949

Project Designation NR-781-005
Contract N60nr-269, T.O.VII
SDC Human Engineering Project 20-E-4

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FOREWORD

The question of the contribution of music in instructional and informational films was raised during a Research Planning Conference of the Instructional Film Research Program in September, 1947. Also, the question of whether or not to use musical introductions, musical backgrounds and terminal music was discussed in a later conference with the Staff of the Navy Photographic Center.

Shortly after the Instructional Film Research Program was initiated in August, 1947, it was found to be practical to produce two versions of a sound film subject which was being edited, one version with and another without musical accompaniment. Work on this research project raised numerous problems and led to the general conviction that there have not been clear definitions of the hypothetical functions which music is supposed to serve when used in instructional and informational films. It became apparent, also, that no satisfactory tests or experimental proofs had been made of the contributions of film music to learning, opinion formation or changes in attitudes. Limited research is in progress at the Pennsylvania State College on these problems.

Mr. John Zuckerman has undertaken and completed a rather comprehensive review of the pertinent literature. In this report he presents selected opinions, viewpoints and hypotheses. It should be clearly understood that this report is an approach preliminary to experimentation. The great need is for actual measurements of the contribution of film music to learning.

The requirements of experimental design for proving or testing hypotheses on music in films are extremely complicated and difficult. Kinds of music, kinds of learning and the characteristics of audiences must be considered. Very extensive research will be required as a basis for valid generalizations.

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INTRODUCTION

At The Pennsylvania State College, a group of specialists in motion pictures, education and psychology are working in the Instructional Film Research Program to discover means of improving or increasing the force and power of instructional motion pictures. One of the problems which has been defined for investigation is that of the use of music in films which are designed for training men, for communicating ideas and concepts, for changing viewpoints and attitudes--in brief, for learning (Carpenter, 1948)*. Theoretically, it is possible that the right kind of music, employed in the proper manner, appropriate to both the subject matter and the audience, may facilitate learning. If music makes any contribution to learning from the film medium (and this is an hypothesis to be tested), then the problem becomes one of establishing what is right and appropriate in terms of the effects of the musical accompaniment on people.

It is commonplace that a motion picture, whether it has been produced for entertainment, information, or instruction, contains some kind of music. Music is included in films partly because of the tradition of accompanying silent pictures with a musical background, played by piano, organ or orchestra; the practice has persisted. In dramatic films, the music has an historical precedent (Browning, 1945) and aesthetic justification (London, 1936, pp. 35-36); many kinds of drama of all cultures have been associated with music. But for the informational and instructional motion picture, music is just "there", without any raison d'etre. Despite numerous statements in all types of literature ascribing important properties to film music, there is little valid information on the actual effects of the music, and no reports of experimentally determined results concerning the roles played by music in factual motion pictures.

The difficulty of establishing what are the "right and appropriate" musical effects is very great, because of this paucity of scientific information on motion picture music. The psychological journals contain only one reference to an article on film music; this paper is a critique of the Disney motion picture Fantasia, based upon the theory that the visual imagery of individuals who listen to music differs so greatly that Disney's choice of subject matter, color and development of musical compositions could not be satisfying or proper (English, 1943). There is a small body of literature dealing with psychological investigations of the general effects of music on audiences. The material which bears on motion picture music has been contributed to a few musical and motion picture journals by musicians, critics, and music educators. Unfortunately, there are almost as many viewpoints as writers, and

* References are arranged alphabetically by author at the end of the paper. Numbers refer to year of publication.

the task of classifying the statements, opinions, and hypotheses is a difficult one. This paper is a preliminary approach to such an ordering, which will provide orientation for a difficult area of experimentation. The need for research work in seeking principles which govern the operation of music to reinforce learning, and the need to state such relationships as may be found quantitatively so that film producers will have authentic guides for including particular amounts and kinds of music in instructional films, is particularly great because of the lack of concrete knowledge in this area.

GENERAL LITERATURE ON MOTION PICTURE MUSIC

Since the literature is rather technical, the reader without some acquaintance with music and motion picture history and development might well consult at first some of the more lucid expositions in these fields. An illustrated history of the sound film, stressing U.S. contributions, may be found in Thrasher (1946); however, the material is oversimplified, with some misplaced emphases. Dr. Kurt London's volume on film music (1936) is comprehensive; Aaron Copland, the composer, outlines (1941) the general direction which musical development might take in the future. For an historical review of music in films, and a list of motion pictures which use music "well", see the article by Winter (1941). One issue of the Music Publishers' Journal is devoted entirely to articles on film music (Vol. 3, No. 5, Sept. - Oct. 1945).

A most useful reference is the recent review of the literature on music therapy and industrial music by Soibelman (1948). In addition to discussing the therapeutic and manufacturing plant uses of music she reports experiments on mood effects of music, and provides through her bibliography (and those of the items she cites) a complete resumé of all published works on the effects of music on human beings.

The functions of music in the entertainment film may be taken simply as what the director conceives them to be, and what the audience perceives them to be. The varied views of composers, musicians, and critics as to what the functions of entertainment film music are can remain opinions without any necessity for testing their verity and application, at least as far as this writer is concerned. For the instructional and informational film, however, it is believed that any added music must function either directly or indirectly to aid learning.

The satisfaction of such a function may be achieved in many ways. Learning criteria are broader than the number

of responses to paper-and-pencil test questions, or the correct performance of perceptual-motor tasks: learning may be defined in terms of the acquisition of favorable attitudes toward institutions or social groups; it may even be the acquisition of conceptual frameworks which enable a learner to structure material so that he retains it longer.

Since there is no information provided by research on how motion picture music assists learning, if indeed it does, a beginning must be made somewhere. Intuitive conclusions, and opinions of composers, musicians, and film critics (mostly referring to entertainment film music and its functions), have been organized here so that they may provide suggestions and even testable hypotheses for research on instructional films.

The possible functions of film music are discussed under the following major headings: (1) informational, (2) emotional, and (3) conceptual and integrative. A list of techniques for achieving those functions, as explained by film composers, and some critiques of those techniques as they have been used in motion pictures, are also provided. Finally, there is an attempt to review the functions of film music as the learning specialist sees them within the framework of previously well established principles of learning.

FUNCTIONS OF MUSIC IN MOTION PICTURES

Informational Functions

Musical symbolism is both more and less complex than verbal symbolism. Because the entire audible spectrum of sound can be used in manifold combinations, large amounts of information could conceivably be conveyed by music, but, since the definitions of musical meaning are loose, unstandardized, and controversial, even within a given culture, the real semantic value of music is probably low. Still, music can be truly classified as symbolic (Morris, 1946, p. 193). In the motion picture, the visual image and sound accompaniment provide a means for establishing associations which can have common meanings for the audience, and thenceforward repetitions of musical symbols without the images, after the associations have been formed, may have the meanings which the composer of the music wishes to convey. For a description of the process by which the composer translates the visual signs and auditory symbols of the motion picture into musical imagery, see the article " 'Three Strangers' " by Adolph Deutsch (1946). A bar-by-bar analysis of the music of Objective: Burma by Morton (1946) is worth careful study by one familiar with musical notation

and terminology because it exemplifies the process of building associations suggested above.

Types of Informational Functions

1. Delineation of personality or character of film actors. Bradley (1947), writing about cartoon music, is concerned with bird and animal personalities, and cites the use of Beethoven's Pastoral Symphony as a general means of establishing the character of outdoor scenes and of animal actors, and the Richard Strauss tone poem Don Quixote as a specific means of depicting an animal (i.e., a sheep). Rodriguez (1946) believes that a feeling for the tenderness of the old wood-carver, Gepetto, is developed by the music which characterizes him in Walt Disney's Pinocchio.

2. Provision of subjective evaluation for an objective image. Pudovkin, quoted by Winter (1941), writes: "As the image is an objective perception of events, so the music expresses the subjective appreciation of this objectivity." Cockshott (1946) suggests that the use of a march tune accompanying the walk home of a man getting up enough courage to "tell his wife off" could determine the reaction of a spectator to the entire scene by providing more information about the man's state of mind than otherwise existed in the visual picture. Winter (1941) suggests that music is a " ... commentary--retaining its own line--on the [film] action."

3. Emphasis for action. Musical underscoring of action is a common device in cartoons, and is used in many live-action pictures. Cockshott (1946, p. 1) quotes the late British film composer, Maurice Jaubert, who describes instances in The Informer in which music imitates "...the noise of pieces of money falling to the ground, and...the trickling of beer down a drinker's throat."

4. Telling a story. Browning (1945) says, "...some selected scene might be projected by this abstract element [music]." A choral episode in The Clock "... is introduced to express the exultation of growing romance. Music took the lead for a moment, but only in telling the story."

5. Recalling past events. Moore (1935) describes the preeminence of Richard Wagner in the use of music to recall to the audience previous emotions experienced by the characters in his musicdramas. A prime example is Siegfried's Funeral March in Götterdammerung, in which all the previous musical motifs describing the hero are repeated during the funeral march.

6. Foretelling the future. In Chapeyev, the Red Commander, a Russian film, an army marches forth to meet a superior force, while the music foreshadows defeat by its sad quality (Moore, 1935, p. 185). According to Browning (1945), George Gershwin's desire to write something of real importance is accompanied (in the film on Gershwin's life) by the familiar motif of the Rhapsody in Blue, to foretell his success. To prepare the audience for the first scene of Medal for Benny, which occurs in church, Victor Young underscored the cast credits and titles with a religious theme (Browning, 1945).

Emotional Functions

While music is often said to be primarily a means for emotional expression, it is difficult for groups of critics (or naive listeners) to agree on which emotions are expressed by various compositions or portions of them. It is probably true that the emotional and cognitive effects of music cannot be clearly separated; in fact, specific emotional messages of music are probably linked very closely to the training of audiences in the interpretation of musical symbolism. Within these limits, however, there is historical and experimental evidence for the existence of some kind of consistency of emotional response to music. Hevner (1935b), in a discussion of this matter, is fairly convincing in her presentation; however, because of the differences within national groups, and the important variables of education and socio-economic status, (as Hevner warns) her conclusions cannot be taken as being universally applicable. She found, by asking college students of widely varying musical talent and experience to check sets of adjectives describing emotions or moods, after hearing especially prepared music, that the following relationships held for her subjects (1935a, 1936):

Modes: "The major mode is happy, merry, graceful, and playful, the minor mode is sad, dreamy, and sentimental..."

Rhythms: "Firm rhythms are vigorous and dignified; flowing rhythms are happy, graceful, dreamy and tender..."

Harmonies: "Complex, dissonant harmonies are exciting, agitating, vigorous, and inclined toward sadness; simple consonant harmonies are happy, graceful, serene and lyrical."

Melodies: The melodic indications were not clear-cut. "There are tendencies toward the expression of both exhilaration and serenity by the descending melodies, and toward dignity and solemnity by the ascending."

Because of the impossibility of completely isolating musical variables, and because their interactions with each other seemed most forceful in conveying any mood effects, Hevner performed further experiments (1937) to test more complex ideas. She found slow tempo and low pitch seemingly related to solemnity and dignity. The minor mode combined with low pitch and slow tempo tends toward sadness, and dissonant harmonies assist in the expression of the sad moods. Other emotional messages evoked by combinations of musical variables are reported in Hevner's study.

While Hevner was not the only worker in this field, her experiments are representative, and well conducted and controlled. Of the earlier experimenters, Schoen, Gatewood, and Washburn and Dickinson provide good reports (in Schoen, 1927). Two recent studies by Rigg (1940a, 1940b) add to the information on emotional effects, as does a study on musical associations by Hampton (1945). Reviews of the experimental approach to music in psychology are provided by Diserens (in Schullian and Schoen's volume, 1948), and in Chapter IV in Soibelman's book (1948), which is an excellent report on experimental investigations, listing the methods of the researchers and their conclusions on musical effects in some detail.

When the motion picture composer intends to convey emotional messages in his music, he may solve the problem of agreement on the meaning of the music by integrating it with the visual images and word meanings to provide associations for subsequent repetitions of the same music, somewhat in the manner of word and picture associations. There is reason to believe that outside associations, previously made with particular music, function to condition audience reactions. This would seem to indicate that entertainment film music should be original, not hinting at thematic material familiar to audiences in other contexts. On the other hand, for instructional films and for specific uses in the dramatic entertainment film, the previous associations of the audience may be utilized to establish a particular atmosphere or mood (e. g., dance music played as a night club scene fades in can do a great deal to establish the locale).

Types of Emotional Functions

1. Establishment of atmosphere or mood. According to Browning (1945) the music in Valley of Decision " ... reflected the dominance of the steel mills, and they in turn mirrored the dominating power of the owners." Bradley (1947) states that general tone colorings of a pastoral type establish the quiet, country mood of outdoor scenes.

Moore (1935, p. 185) considers one of the main functions of film music to be establishment of atmosphere. He says, "Not only place but period can be suggested powerfully by the character of the music." Spaeth (1945) avers that music, if properly done, establishes "unmistakeable moods" and creates "perfect atmosphere."

2. Adding to the emotional tone or mood of incidents. A single chord in The Picture of Dorian Gray reflects the title character's shock when he is told of his sweetheart's suicide, states Browning (1945). Cockshott (1946) insists that "... a criterion of the excellence of film music [is] that it unobtrusively heightens the mood of a scene..." Copland (1941) feels that "...music is like a small flame put under the screen to help warm it."

3. Pointing up dramatic or comic highlights of the film. Spaeth (1945) claims that the composer must "... write a score that gives exactly the right emotional value to various dramatic or comic climaxes..." Moore (1935) states that music enhances dramatic values, and intensifies the "...incidence of climax, and prepare[s] for further dramatic action...[Music is] a magnificent aid to any form of dramatic projection." Copland (1941) suggests that music intensifies "the emotional impact of any given scene."

Conceptual and Integrative Functions

Much controversy about the functions of music, in films or otherwise, centers around the question of whether or not music provides a framework for conceptual thinking, or stimulates inferential ideation and imagination. Gatewood (1927) holds that music has ideational content, as well as emotional and informational values. The writers on film music seem to support this notion.

Types of Conceptual and Integrative Functions

1. Unification of dramatic material. Copland (1941, p. 236) claims that "...film music makes sense only if it helps the film....Music...can subtly hold disparate scenes together." Music creates "an illusion of continuity." Moore (1935) says "...music has three great contributions to make to the play or picture: unity, atmosphere, and enhancement of dramatic values."

2. Association of ideas. London (1936, p. 135) states one of the functions of music in the film is "to establish associations of ideas and carry on developments of thought." Winter (1941) remembers an example in Painlevé's French film Hippocampes where "...a brisk parody of all the hackneyed

sound tracks that are inevitable for [racetrack] newsreels ..." accompanying swimming sea-horse images enables the audience to establish an unusual association of ideas. Thrasher (1946) feels that, "Such musical scores as those written for The Informer, Spellbound...and Saratoga Trunk stick in the memory of filmgoers,--or what is more important, a strain of music when heard evokes the scene with which it was integrated."

3. Connection of dialogue sequences. London (1936, p. 135) sees the necessity of music in sound films "...to connect dialogue sections without friction..." Copland (1941, p. 263) states that music is needed to give a neutral background behind dialogue.

4. Accompaniment for sequences of silent action. Film music makes "...possible long sequences of silent action, which, but for the music, would be unbearable." (Bradley, 1947). Spaeth (1945) agrees that "...good music and good photography are enough to sustain interest..." in a montage sequence with little dialogue.

TECHNIQUES OF MUSIC IN MOTION PICTURES

Probably the most important ideas for the researcher in instructional films are found in the specific descriptions of techniques used by composers and directors to achieve their intended effects. While these musical devices have not been tested experimentally, those which are well established musically, if subjected to tests to determine their actual effects upon film learning, might well provide some sound principles for the addition of music to instructional films. At least, there would be more justification for music than the feeling that "there ought to be some music in this film." Not only can we learn something from techniques which are cited as "good", but we may perhaps find that "clichés," "too familiar" selections, and "excessive" uses are the very reinforcements necessary to promote learning. Articles on film music techniques are suggested as general references. A small volume by Cameron (1947) on the sound engineering aspects of film music is useful for one new to the field. Sternfeld's description of " 'The Strange Music of Martha Ivers' " (1947), Nelson's theoretical treatment of musical color versus melody for films (1946), and the study by Morton previously referred to (1946) might provide material for experimental designs to test the effects of musical techniques. The best way of organizing comments on musical techniques seems to be to state them in terms of musical variables. The following examples include both advocated and "bad" uses of musical devices.

List of Film Music Techniques

1. Tempo and rhythm. Copland (1941) protests against the device "very peculiar to Hollywood [which] is known as 'Mickey-Mousing.' " (accompanying all actions in a film by music in synchronized tempo). Rodriguez (1946), on the other hand, asserts that timing is very important in cartoon music; that the composer must "...gear himself to the film speed, and convert seconds and rhythms into frames and sprocket holes per second." Pare Lorentz's instructions to his composer-collaborator in the documentary The Fight For Life created the entire rhythmic structure of the film (in Thrasher, 1946, pp. 255 - 256): "Every scene was directed to a metronome, and for dramatic effect the music must start exactly with the film--from the moment we see 'City Hospital' until the baby is born, the beat of the music must not vary, and there must be no change in instrumentation sufficient enough to be noticeable...We must have the mother's heart beat, two beats in one, with the accent on the first one... The minute the child is born, the baby's fluttering heart dominates the beat, so for this transition...a trumpet cry: a crescendo--any device you may wish to use for the birth pain is merely a cue for a different beat..."

2. Cueing and accentuation. The use of a sinister chord intended to suggest that something unusual will shortly take place, or to attract attention to a coming event not within the knowledge of the screen actors, spoils the dramatist's intentions, according to Cockshott (1946, note, p. 6). He says, though, "Where the script relies on the method of irony rather than surprise, this practice is legitimate, since the audience is already 'in the know'..."

3. Tone Coloring. Bradley (1947) suggests that strings, not brass or wind instruments, should be used under dialogue if the music is to be heard, and not faded down by the sound engineers. He also advocates the depiction of individual characters by individual tone colors, a technique he used in the music for Courage of Lassie. Cockshott (1946, p. 7) thinks that economy of tone color should be practiced, and praises a sequence in Stricken Peninsula, a British documentary film, for which the composer Vaughan Williams provided a simple English-horn motif for a scene of devastation. Waxman (1945) says: "I believe that the first and primary principle of good scoring for motion pictures is the color of orchestration. The melody is only secondary." Nelson (1946) provides theoretical considerations which agree with Waxman's statement. Cockshott (1946, p. 5 and p. 7) rails against "...hack writers of vulgar fanfares and stale panache, the raucous rosalias during the chase, the sul ponticello bowing and chords on the muted brass that

appear with the villain, the bassoon solo that accompanies the boss on his way home from a party, the feeble music for women's voices so often employed by Walt Disney ... French film orchestration has its clichés, of course--the saxophone, the tinny cantabile trumpet, the percussive chord on the piano--but they are not clichés suggestive of cheap sentiment: the fanfares, the harp arpeggios, the sentimental solo violin, the luscious string tune of the American cinema..."(It is interesting to note that Cockshott's approval of economy in tone color is taken by his American reviewer to be motivated by the relative poverty of the British film industry. See the review by Morton (1947-1948b) in Hollywood Quarterly). London (1936) suggests the use of electronic instruments for new tone colors, and Maurice Jaubert, writing in Footnotes to the Film. A British publication, advocates that one "... subtly mingle a musical with a non-musical sound (the noise of a train developing a rhythm which merges gradually into actual music...)"(quoted by Cockshott, 1946, p. 1).

4. Thematic structure, length and development. Walter Leigh, in a Cinema Quarterly article published in Great Britain (Cockshott, 1946, p. 2), says: "A phrase of five bars lasting twenty seconds suitably fitted to thirty feet of picture may express as much as a whole movement of a symphony." Kubik (1945) believes that "music is an art which exists in time, and for it to work...it must have time ..." Bradley (1947) thinks that "Although original music is usually better for film scoring, we sometimes have to use well-known tunes as cues." Cockshott (1946, note, p. 3) cites as excellent examples of thematic development three films: Bone Trouble, a Disney cartoon which uses variations on the "Pluto theme"; The Hague, a documentary which demonstrates the atmosphere of town and country with two contrasting themes; and the ABC-Trio-CBA musical form by Tibor von Harsanyi in the cartoon La Joie de Vive. Moore (1935, p. 184) says that "Familiar music lifted from its context carries with it its original associations." This "provides a distraction, not an enhancement." (This point, if it is true, is especially important for learning theory applied in films.)

5. Volume and intensity. In the animated cartoon "...music has a fighting chance to be heard above the sound effects," according to Bradley (1947). Cockshott (1946, p. 6) and Thrasher (1946, p. 256) agree in advocating the use of silence for contract. Cockshott states that "Where a director considers it necessary for music, natural sounds and dialogue to run simultaneously he should call for the merest musical suggestions." Thrasher says: "Silence is used constantly as a counterpoint against sound, to intensify the emotional content of a scene."

6. Style and musical schools of composition. Cockshott (1946, p. 4) believes that music of the atonal type is more suitable for accompaniment to morbid melodramas, than for films whose subject matter is "lyrical and constructive." Bradley (1947) contends that "more freedom in composition" is permitted a cartoon composer. Copland (1941, pp. 265-268) deplores such stylistic faults as the excessive use of leit-motivs, imitation of screen events and realistic sounds by the orchestra, and 19th century romantic symphonic style used excessively. Spaeth (1945) states that the composer must keep his work unobtrusive, and carry out his mission of aiding the film; "... but he must never let his listeners know what he is doing..."

7. Integration of music, sound effects, speech and visual image. Eisenstein is said to have attained a high correspondence between the visual and aural material of Alexander Nevsky, with Prokofiev as the film composer (Cockshott, 1946). Cockshott (1946, p. 3) says of the documentary Song of Ceylon: "It is worth noting that the commentary was calculated as an effect: presumably any disagreeable overlapping of music and narration was avoided when the original script was prepared." According to Thrasher (1946), the work of Pare Lorentz represents the highest type of integration of all motion picture elements (see quotation above on the use of rhythm in a documentary).

FUNCTIONS OF THE FILM MUSIC COMPOSER

As can be noted from many of the quotations a number of the writers are preoccupied with criticism of what is being done in motion picture music. Not content with discussing functions of film music, some of the writers have extended their criticisms to the functions and duties of the film composer. Articles such as that by Erich Leinsdorf (1945), conductor and music critic who charged that Hollywood motion picture music allows no freedom for "original thinking," and a reply by Bernard Herrmann (1945), young motion picture, radio and theater composer-conductor, may be valuable in presenting a fuller picture of the controversial nature of the opinions about film composers and their music. Specific criticisms of individual motion picture musical accompaniments are found in the series of articles by Morton (1946, 1947, 1947-48a, 1948) in the Hollywood Quarterly, and in reviews by music critics of metropolitan newspapers, such as a recent critique (of the music by Aaron Copland for The Red Pony) written by Virgil Thomson (1949) for the New York Herald Tribune.

APPLICATIONS TO LEARNING FROM FILMS

From many of the critical articles mentioned above, beliefs, opinions, intuitive conclusions and original ideas may be garnered which, when suitably formulated in psychological terms, could provide hypotheses for research on the functions of music in instructional motion pictures. Also fruitful for study are those works dealing with predictions of the future of film music, and research on perceptual phenomena. London (1936, pp. 195-199) advocates experimentation with "handwritten music" inscribed directly on the film sound track, and suggests the use of variable resonance conditions for recording studios and theaters (pp. 200-210) and "stereoscopic sound" (p. 204). Thrasher (1946) discusses the possibilities of stereophonic or "multi-channel" music. An article by Jones (1946) links music with "non-objective" animated art. Werner Jannsen (1945), composer and conductor, advocates the combination of music with neutral patterns which "suggest...a possible meaning for those who 'don't know what to think about' " as a device for musical education. A set of principles for the illustration of musical moods is postulated by Karwoski, Odbert, and their collaborators (Karwoski and Odbert, 1938; Karwoski, Odbert and Osgood, 1942; and Odbert, Karwoski and Eckerson, 1942); these principles stem from investigations of the agreements on music-color pattern relations achieved by chromesthetic music listeners.

For the learning specialist, the functions of music as defined by composers and critics are important as they are examined in the light of the classifications of principles of learning well established by psychological and educational experimentation (McGeoch, 1942). It seems possible that the psychological experimenter will find much of usefulness in the following relationships:

1. Perceptual direction. Music could provide an initial set for attention by overcoming perseveration or previous distractions. It could be used as a "pointer" to direct attention to a particular occurence in the visual stream or the sound track. By contrasting tone colorings music might sustain attention for long periods and prevent day-dreaming. Stimulus repetition may be used in music as an attention aid, as well as for memory reinforcement. The novelty of a musical color, rhythm, theme, or tempo could be used to attract attention.

2. Motivational aids. Music might provide a kind of "reward" in that a learner, recognizing an association intended by the music, would sense a pride in correct performance (self-praise). The provision by music of an emotional tone to the learning experience might provide the mild excitement thought useful in promoting learning.

3. Conceptual aids. Music of a familiar nature might provide clues for inferential thinking by association with a new experience not previously related to familiar ones. It might in the same way provide "direction" for problem-solving. By organizing and providing continuity and "closure" it could provide elements of a conceptual framework.

4. Memory reinforcements. The use of music is suggested to establish associations of familiar with the unfamiliar, or to associate new learnings in a framework of music to aid recall. Music may be repeated with a visual stimulus to provide variation with repetition, and finally repeated without the visual image to provide recall with reduced cues (redintegration). The repetition of music might provide over-learning, to increase retention.

5. Attitude and opinion determiners. Music regarded highly by the audience might serve to secure favorable attitudes toward the visual and auditory material of films. The same device could operate in reverse (e.g., it was the intention that the "doom march" which characterized the Nazis in the Capra series for the Signal Corps, Why We Fight, help the audience to form an unfavorable attitude toward Nazi aggression).

It must be made clear once more that the relationships suggested above are not supported by an experimental evidence, and that they may well prove ineffective when tested experimentally in actual learning situations. However, it is also suggested that the kind of music normally attached to instructional films (that is, music not composed for the films, but selected from "canned" music libraries by the foot, without sufficient regard to suitability) will certainly not operate to accentuate learning. This particular hypothesis is under experimental study by the Instructional Film Research Program at the present time, and preliminary results seem to indicate that the mere presence of music is not an aid to learning. On the contrary, it may even distract or divide attention. What will be found as experimentation progresses is not indicated by what is known at present about the effects of music in instructional films.

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